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Today's youth are using PC and mobile new media technologies at unprecedented levels, and several recent large-scale studies have explored and reported upon the scope and nature of this media use. Fueling much of this growing field of inquiry, research and development is the influential \$50 million grant initiative of the MacArthur Foundation, which has termed this field "Digital Media and Learning" (DML). The scale of the MacArthur initiative signals the importance that youth learning with digital media is seen to have in today's social, educational, policy and entrepreneurial landscapes.

One recent study to emerge from the Macarthur Foundation-funded projects is the expansive ethnographic "[Living and Learning with New Media](#)" report, in which the authors (Ito, et al, 2008) identify 3 main genres of technology participation and engagement by today's youth. These genres include: *hanging out*, *messing around*, and *geeking out*. The authors report that today's youth who use new media to engage in "hanging out" are "always on" – remaining in contact with peers they know in their offline lives at almost all times, through use of networked PC technologies and mobile devices which extend the communication in friendships. Further, the report notes that youth develop their own media literacy through tinkering or "messing around" with new media, exploring new interests and learning independently. And, some youth, who were identified in the study as "smart, different, or creative, and who generally exist at the margins of teen social worlds," also engage in "geeking out" behavior, which is characterized as highly social and engaged interest-driven new media use within specialized knowledge areas. This "geeking out" activity may occur locally, or among youth who are more geographically distributed, with interaction supported by technology.



The study points to several educational implications of their findings. Specifically, the report states, "new media allow for a degree of freedom and autonomy for youth that is less apparent in a classroom setting. Youth respect one another's authority online, and are often more motivated to learn from peers than adults. Their efforts are also largely self-directed, and the outcome emerges through exploration, in contrast to classroom learning oriented toward set, predefined goals." The findings suggest that the technology and World Wide Web environments

used by today's youth support their autonomous, open-ended inquiry and exploration, leading to new forms of self-directed informal learning.

Much of what researchers know about autonomy and autonomous human behavior more generally has emerged from the work of leading motivation psychologists Edward Deci and Richard Ryan, and their [Self Determination Theory](#). These scholars find that self-determined, intrinsically motivated behavior (i.e., where motivation is driven from internal interests of the individual rather than by external factors) leads to personal fulfillment, in the form of positive life and livelihood outcomes. Intrinsically motivated behavior is associated with three main affective (emotional) states: an individual's feelings of perceived competence, autonomy, and social relatedness. These feelings are internal to the individual and can also be supported by factors in the external environment surrounding the individual, for instance within family and school contexts.

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Funding support from



Ito and her colleagues found that youth autonomous engagement with the information, resources, and individuals afforded within today's networked technology environments support youth interests and their motivated engaged exploratory behavior. Further, the social interaction that occurs while "hanging out, messing around, and geeking out" provides evidence that social relatedness also plays a role in the intrinsically motivated behavior of youth engaged in technology uses. Autonomy and social relatedness are two of the main contributors to self-determination in Ryan and Deci's theory. Ito et al's findings regarding motivated behavior in the technological realm therefore partially support the universal applicability of Ryan and Deci's broader psychological theory of intrinsic motivation.

The slate of recent reports on youth technology engagement do not explicitly address the construct of "perceived competence," the third main affective state associated with intrinsically-motivated behavior in Deci and Ryan's broader psychological research. In the Spring of 2008, a team of researchers at Syracuse University's Center for Digital Literacy set out to better understand the role of emotional affect in children's technology uses and their digital literacy, applying the self-determination theory of Deci and Ryan in the context of information and digital skills.

In this study, researchers Marilyn Arnone and Rebecca Reynolds developed a set of survey instruments to measure U.S. 8th-graders perceived competence in information and digital skills, applying published instruments resultant from Deci and Ryan's motivational research in the information and technical domains. Each researcher also contracted the licensed use of validated knowledge tests created by two established research organizations. The test addressing information skills was derived from the TRAILS initiative knowledge test for 9th graders at Kent State University, based on the ALA Information Power standards circa 2006. The test addressing digital technology skills was derived from LearningPoint Associates' digital knowledge test for 8th-graders, created and validated based on the ISTE NETS technology literacy standards, also circa 2006. Reynolds and Arnone used these instruments to statistically analyze the relationships between perceived competence in both information and digital skills, and performance on both of the respective actual knowledge tests.

Findings from the SU survey of U.S. 8th graders *indicate that indeed, perceived competence is a positive correlate to their performance on the test of actual knowledge, in both the broader information skills and more targeted digital skills domains. Perceived competence in digital skills is also a positive correlate to frequency of technology engagement in all categories of technology engagement measured, including self-reported frequency of information-seeking, socializing online, creating with digital media, publishing digital media, and gaming. These results shine a lens on a third affective variable that appears to be a significant factor of youth technology engagement – perceived competence – which adds to the picture presented in Ito et al's work, and which may contribute toward theory of intrinsically-motivated technology use among youth.

Perceived competence is operationalized in the study as "confidence" to engage in a given endeavor. We have all seen what a lack of confidence in computing looks like, among youth, students, and adults in our own age cohorts alike. Novice users often worry about breaking something on the machine. They may feel reticent to ask for help, in an environment where they feel peers' technology understanding are passing them by. They may also feel a class bias that causes hesitation to ask for help, due to the high costs of technology affordances, and the positive association still present between socio-economic status, and technology uses (i.e., the problems of the digital divide).

Our research finding of a positive correlation between perceived competence, and technology use and knowledge, suggests that by supporting the confidence of young learners in their technology engagement, you can make a real impact upon their frequency of technology uses, their technology knowledge, and the range of informal learning outcomes that Ito, et al have found to be a result of youth technology engagement.

Based on these results, we offer the following TIPS and RECOMMENDATIONS for educators and library specialists:

1. Information = power, for both you, and your students. So, [learn more](#) about the range of technology uses your students are likely to be engaging in. Become an astute observer of new informal learning processes made possible by your students' new media technology uses. These new forms of learning can be better supported with your greater understanding and awareness.
2. The empirical research outlined above suggests that educators and library specialists in the school context can make a direct impact on student learning by remembering and applying the following learning formula in your information and digital literacy curriculum and pedagogy:



Intrinsically Motivated Informal Learning with Technology = Perceived Competence, Autonomy, and Social Relatedness

To facilitate intrinsically motivated, self-driven forms of informal learning, think more about ways you can:

- Support students' *perceived competence* (confidence) in their constructive technology use. While the early technology adopters among your students may be advancing full steam ahead in their self-directed technology use, some students may need an initial push to boost their confidence in order to enable them to begin to appropriate given technology activities. The support of an engaged educator can go a long way here in launching informal learning processes.
- Support students' *freedom and autonomy* to engage in technology use in the school setting. For instance, in most of today's schools, at least some level of technology is present, but often goes under-utilized. Encourage your students to maximize technology-learning opportunities through greater access and time on tech tasks and advocate in the school context for greater affordances in doing so (this is one of those – "easy to say, not so easy to do..." recommendations).
- Support students' *social relatedness*. Students' co-learning with peers as they engage in exploratory self-directed inquiry with technology can result in highly positive outcomes in informal learning. The key is to determine the right activities that result in *constructive* forms of peer social engagement. Think about engaging students in constructive team projects that require learners to create complex digital artifacts, reflecting the results of their inquiry and exploration.

Meanwhile, continue to check in to *Educators' Spotlight Digest* to find out more targeted recommendations and tips as we continue analyzing our research results and specifying the best constructive tools and activities that align with the theoretical advancements we are generating, with a goal of eliciting successful informal learning outcomes in students that advantage them in their future. You can share your ideas by writing to the editor at mparnone@syr.edu. Some of them can be shared in the next issue in this column or even *Motivational Strategies That Work!*

*N= approximately 1200 students, weighted to account for race/ethnicity distributions based on national percentage figures reflecting all students enrolled in U.S. elementary and secondary schools in 2005.

About The Author



Rebecca Reynolds, Ph.D. is a researcher focused on children's uses of technology for learning. Recently she has conducted research on youth game design and Web 2.0 engagement on projects with a social mission. She is currently completing analysis of a large-scale study of U.S. 8th-graders' digital literacy, in collaboration with Dr. Marilyn Arnone at the Center for Digital Literacy, Syracuse University.